

REMARKS

Claims 97-122 are pending in the application with claims 110 and 116 amended herein and new claims 121 and 122 added herein.

Claims 110, 111, 113, 114, and 116 stand rejected under 35 U.S.C. 102(b) as being anticipated by Nishioka. Applicant requests reconsideration.

Amended claim 110 sets forth an integrated circuit that includes, among other features, a hemispherical grain platinum layer having a thickness of at most about 600 Angstroms and a continuous surface characterized by columnar pedestals with an average diameter of at least about 200 Angstroms and an intervening layer between the hemispherical grain platinum layer and a substrate. Pages 2-3 of the Office Action allege that Nishioka discloses each and every limitation of claim 110. Applicant traverses.

The amendment to claim 110 setting forth that the platinum layer has a thickness of at most about 600 Angstroms is supported at least by page 12, line 16 to page 13, line 10 of the present specification, discussing the features of a platinum layer shown in Fig. 4. Also, the amendment is supported at least by page 9, line 10 to page 10, line 4 of the present specification, discussing relative advantages of different thicknesses, in particular when an intervening layer is provided. Accordingly, Applicant asserts that the present specification supports actual reduction to practice of the integrated circuit of claim 110 and describes the advantages of providing a platinum layer having a thickness of at most about 600 Angstroms.

By comparison, Nishioka merely describes Pt film adhesive layer 4 as having a thickness of approximately 2000 Angstroms (200 nm). Accordingly,

the thickness of the claim 110 platinum layer is less than 1/3 of the thickness of Pt film adhesive layer 4 in Nishioka. The integrated circuit of claim 110 allows such a device to be used in circumstances where close packing of devices generates tight spacing requirements, as set forth in the present specification. Nishioka fails to disclose the thickness set forth in claim 110 and thus fails to anticipate claim 110.

Applicant further notes that Pt film adhesive layer 4 in Nishioka “is formed by sputtering.” Such processing constitutes a categorically different type of processing than exemplified in the present specification at least at page 11, line 19 to page 13, line 10 for CVD of hemispherical grain platinum. Nishioka does not disclose or suggest and is not alleged to disclose or suggest that sputtering is capable of forming a hemispherical grain platinum layer having a thickness of at most about 600 Angstroms and a continuous surface characterized by columnar pedestals with an average diameter of at least about 200 Angstroms. Accordingly, a person of ordinary skill viewing only the teachings of Nishioka cannot conclude that merely minimizing sputtering to produce a thinner platinum layer will necessarily produce a platinum layer still possessing the desired properties. At least for such additional reason, Nishioka cannot be considered to suggest the subject matter of claim 110.

Amended claim 116 sets forth a capacitor that includes, among other features, at least one of a first and a second capacitor electrode including hemispherical grain platinum having a thickness of at most about 600 Angstroms and a continuous surface characterized by columnar pedestals

having heights greater than or equal to about one-third of a total thickness of the platinum and having an average diameter of at least about 200 Angstroms.

As may be appreciated from the discussion above regarding the deficiencies of Nishioka as applied to claim 110, such reference fails to disclose every limitation of claim 116.

Claims 111, 113, and 114 depend from claim 110 and are not anticipated at least for such reason as well as for the additional limitations of such claims not disclosed. As established herein, Applicant asserts that 110, 111, 113, 114, and 116 are not anticipated and request allowance of such claims in the next Office Action.

Claim 111 stands rejected under 35 U.S.C. 103(a) as being unpatentable over Nishioka in view of Yamauchi. Applicant requests reconsideration. Claim 111 depends from claim 110, the subject matter of which is discussed above. Review of Yamauchi reveals that such reference fails to remedy the deficiencies Nishioka discussed above. Combination of references cannot be considered to disclose or suggest limitations that are absent from both. Accordingly, claim 111 is patentable over Nishioka in view of Yamauchi.

Claims 112 and 115 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Nishioka in view of Nishioka. Applicant requests reconsideration. Some confusion exists regarding why the subject claims are rejected over Nishioka in view of Nishioka since both references appear to be the same. Regardless, claims 112 and 115 depend from claim 110 the subject matter of which is discussed above. Nishioka does not disclose or suggest

and is not alleged to disclose or suggest every limitation of amended claim 110. Claims 112 and 115 are thus patentable at least for such reason as well as for the additional limitations of such claims not disclosed or suggested. For example, claim 115 sets forth that the columnar pedestals have an average diameter of about 200 Angstroms.

Page 5 of the Office Action acknowledges that Nishioka does not disclose the average diameter, but alleges that it would be obvious to discover as an optimum value of a result effective variable. Nevertheless, Applicant asserts that the Office Action does not establish a prima facie case of obviousness. First, Nishioka does not suggest to those of ordinary skill that they should make an integrated circuit with the claimed hemispherical grain platinum layer having columnar pedestals with an average diameter of about 200 Angstroms. Second, Nishioka does not reveal that in so making, those of ordinary skill would have a reasonable expectation of success.

Pages 1-2 of the present specification discuss the problem of platinum-comprising materials having a relatively smooth upper surface and the advantage of incorporating roughened platinum-comprising layers into integrated circuitry. Nishioka does not include any disclosure or suggestion of the problem of platinum-comprising materials having a relatively smooth upper surface or of the advantage of such materials having a roughened upper surface.

Applicant notes that the Federal Circuit has determined that the problem confronted by the inventor must be considered in determining

whether it would have been obvious to modify references in order to solve that problem. Diversitech Corp. v. Century Steps Inc., 7 USPQ2d 1315, 1318 (Fed. Cir. 1988). If the references do not address or even recognize the problem they cannot begin to teach or suggest a solution to it. None of the references cited in the Office Action address the problem solved by Applicant's invention and, accordingly, cannot suggest a solution to such problem. The Federal Circuit further stated that "the nature of the problem 'which persisted in the art,' and the inventor's solution, are factors to be considered in determining whether the invention would have been obvious to a person of skill in that art." Northern Telecom v. Datapoint Corp., 15 USPQ2d 1321, 1324 (Fed. Cir. 1990). In Northern Telecom, the Federal Circuit confirmed a finding that the claims were valid in view of prior art that did not "suggest the [inventors'] solution" to a problem. Id. at 1323-24.

Nishioka cannot be considered to suggest to those of ordinary skill that they should make the claimed integrated circuit since Nishioka does not provide any discussion of enhancing a surface area of a platinum-comprising material. The Office Action admits that Nishioka does not teach the claimed average diameter of about 200 Angstroms. Applicant asserts that Nishioka further does not provide any suggestion or motivation to provide a layer with columnar pedestals having such a feature. Nishioka does not in any way recognize some advantage that may exist in providing the claimed columnar pedestals in a platinum layer. As far as Nishioka is concerned, the average diameter of about 200 Angstroms does not provide any advantage. At least

for such reasons, Nishioka does not suggest to those of ordinary skill that they should make an integrated circuit with the claimed hemispherical grain platinum layer having columnar pedestals with an average diameter of about 200 Angstroms. Thus, the Office Action fails to establish the first requirement of a prima facie case of obviousness.

Page 6, lines 5-21, page 8, line 19 to page 9, line 9, page 11, lines 9-14, page 13, lines 18-21, and elsewhere throughout the present specification establish that it is possible to control a grain structure and/or roughened surface of platinum-containing material by controlling various process parameters. For example, the present specification identifies deposition temperature, oxidizer flow rate, carrier gas flow rate, and other conditions as influencing the surface structure of a deposited platinum-containing material. Further, the specification describes process parameters that will not produce the hemispherical grain platinum layer set forth in claim 115.

By comparison, Nishioka does not provide any discussion of the process parameters used to form Pt film adhesive layer 4 alleged by the Office Action as suggesting the hemispherical grain platinum layer set forth in claim 115. Nishioka does not recognize that certain process parameters will produce the claim 115 platinum layer and other process parameters will not. It is impossible to tell from Nishioka whether or not Pt film adhesive layer 4 is capable of being produced by the Nishioka sputtering process to possess an average diameter of about 200 Angstroms. The Office Action alleges that it would be obvious to discover such an optimum value for average diameter.

However, Nishioka does not contain any disclosure or suggestion of the technical information needed to produce such a characteristic in platinum-containing material. Only the Applicant's own specification provides the needed technical information.

For example, page 9, lines 5-9 of the present specification describes a preferred temperature range. Page 13, lines 8-10 describe a temperature range wherein the hemispherical grain platinum layer of claim 110 will not be formed. Page 7, line 13 to page 8, line 3 discusses a preferred oxidizer flow rate. Page 11, lines 9-14 discuss an oxidizer flow rate wherein the platinum layer of claim 110 will not result. In addition, Fig. 4 described on page 11, line 21 to page 12, line 15 shows a hemispherical grain platinum layer that results from a certain set of process parameters. In comparison, Fig. 5 and page 13, lines 11-21 show a platinum layer that does not contain hemispherical grain platinum as a direct result of the selected process parameters.

Nishioka does not disclose or suggest any of the relationships and significance of process parameters for producing a hemispherical grain platinum layer with columnar pedestals having an average diameter of about 200 Angstroms. At least for such reason, Applicant asserts that Nishioka does not reveal a reasonable expectation of success in making the integrated circuit of claim 115. Applicant above establishes that Nishioka also does not suggest making the claimed device. However, even if some basis can be found in the art for making the claimed device, Applicant has demonstrated

herein that no reasonable expectation of success exists in attempting to make the integrated circuit of claim 115. At least for such reasons, claim 115 is patentable over Nishioka.

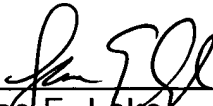
At least for the reasons indicated herein, Applicant asserts that claim 115 is patentable over Nishioka. New claim 122 depends from claim 116 and sets forth that the columnar pedestals have an average diameter of about 200 Angstroms. Such claim is also patentable as may be appreciated from the discussion above.

New claim 121 depends from claim 110 and sets forth that the thickness is from about 300 to about 400 Angstroms. New claim 121 is supported at least by page 10, lines 1-4 of the present specification.

Applicant herein establishes adequate reasons supporting patentability of claims 97-122 and requests allowance of such claims in the next Office Action.

Respectfully submitted,

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